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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/733,788

12/10/2003

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MWS-106RCE

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03/31/2009

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EXAMINER

SILVER, DAVID

ART UNIT

PAPER NUMBER

2128

MAIL DATE

DELIVERY MODE

03/31/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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**DETAILED ACTION**

1. Claims 1-9 and 11-71 are currently pending in Instant Application.
2. The Instant Application is not currently in condition for allowance.

***Priority***

3. Priority is not claimed (**12/10/2003**).

***Response to Arguments***

***Response: 35 U.S.C. § 103***

4. **Applicants argue:**

- 4.1 "In order to better clarify claim 1, Applicants amend claim 1 to recite providing a graphical debugger that concurrently interfaces with a model view of a model being executed and an execution list view of methods called during an execution of the model. Applicants respectfully submit that MathWorks, the Official Notice taken, and Alpern, alone or in any reasonable combination, do not disclose or suggest the above-quoted feature of amended independent claim 1." (Remarks: page 19)
- 4.2 "There is no indication that the debugger of Alpern could be applied in a block diagram modeling situation, as described in claim 1." (Remarks: page 19, last paragraph)

5. **Examiner Response:**

- 5.1 Regarding subsection 2 *supra*, as demonstrated by MathWorks' (**page 1-2 last paragraph; and 3-49**), the references indeed concurrent interfaces. This is because the debugger and the software suite as a whole are essentially a single program, they inherently run concurrently and interface with each other.
- 5.2 No comment regarding subsection 2 *supra* is made as the arguments are conclusionary and only review the Alpern reference without taking the rejection as a whole. The feature argued is taught by MathWorks.

6. **Applicants argue:**

- 6.1 "However, Alpern does not disclose debug information indicating order of execution of said plurality

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of execution methods for said block and a start time or a stop time of said plurality of execution methods for said block that are executed during the execution of said model. Neither the frames, nor the routines, of Alpern are execution methods for a block." (Remarks: page 20, last paragraph)

6.2 "The "routines in the order executed" of Alpern do not constitute execution methods for said block, because Alpern is not concerned with a "block" in a "model."" Remarks: page 21, first 4 lines)

7. **Examiner Response:**

7.1 A block is not executable, the block represents a piece of code. A routine is inherently code that is executable. Alpern discloses, and Applicants do not argue, the order and start / stop time of a plurality of methods (routines). The routines are functionally equivalent the pieces of code that the blocks represent. The code that is executed represents the blocks. Therefore, the routines represent the blocks. **(Fig 2 and related text)**

8. Arguments in Remarks section 2 (page 21), section 3 (page 22), section 4 (page 24), section 5 (page 26), section 6 (page 27), section 7 (page 29) are repetitive of the arguments addressed above. To not belabor the issue, attention is drawn to the above responses.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-9 and 11-71 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **written description requirement**. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

9.1 Regarding all independent claims, Applicants' amendments present new matter that was not previously disclosed in the Specification in such a way as to reasonably convey to one skilled in the

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relevant art that the inventor(s), at the time the application was filed. Specifically, the concurrency of the debugger and its interface with the model being executed, and the list view, are not disclosed adequately. Applicants, contrary to the previous Office Action's request (OA dated 9/25/2008 - paragraph 4), did not provide adequate support within the Specification. After extensive search, the support for these features could not be found in the Specification. Further, the Specification does not adequately disclose that the debugger concurrently interfaces with an execution list view of methods called during an execution of the model.

10. The above cited rejections are merely exemplary.
11. The Applicant(s) are respectfully requested to correct all similar errors.
12. Claims not specifically mentioned are rejected by virtue of their dependency.
13. Claims 1-3, 5-9, 17-22, 24, 25-27, 29-33, and 41-46, 48-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over MathWorks' Simulink "Dynamic System Simulation for MATLAB" "Using Simulink Version 2.2", 1997 ("**MathWorks**"), and further in view of **Official Notice taken** (admitted prior art) further in view of Alpern (**US 7107578**).

As per claim 1, MathWorks discloses: In a modeling and execution environment, a method comprising the steps of:

providing a graphical debugger concurrently interfaces (**page 1-2 last paragraph**) with:

a model view of a model being executed (**page 1-2 last paragraph**); and

an execution list view of methods called during execution of said model (**page 3-49**),

said model comprising a block having at least a method (**12-3; 9-37; 9-42 "The block can integrate using these methods: ..."**), said graphical debugger having debug information related to the execution of said model (**12-3**), and a start time or a stop time of said plurality of execution methods for said block that are executed in said block during the execution of said model (**start time ... 12-3 last para; 2-12; stop time ... 4-2 "An important advantage is that you can perform certain operations interactively while a simulation is running:**

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**You can modify many simulation parameters, including the stop time, the solver, and the maximum step size.”);** and outputting said debug information to a user, said debug information allowing the user to determine proper or improper operation for at least a subset of said plurality of execution methods that are executed during the execution of said model. MathWorks implies but does not make explicit that “a block includes a plurality of execution methods” **(12-3; 9-37; 9-42 “The block can integrate using these methods: ...”).**

Official Notice is taken with respect to this feature - Office Action is admitted prior art due to inadequate traversal.

The legal basis for the 35 U.S.C. § 103 rejection is detailed in MPEP 2144.04.VI.B titled “Duplication of Parts”, wherein it is described that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In this instance, merely duplicating the number of methods that each block contains does not produce a new and unexpected result.

Motivation to do so would have been to create a more compact design, which is also not a patentably significant feature. See MPEP 2144.04.V.B.

Further, the combination of MathWorks and the Official Notice does not expressly disclose that “said debug information indicating an order of execution of said plurality of execution methods for said block”, however MathWorks hints at this **(12-16, 12-16 to 12-19, 12-5).**

Alpern however discloses an analogous system having the said features **(Fig 5 and description; col: 12 line: 35-46: “The frame stack 530 of FIG. 5 is useful at a single debugger client because it shows the sequence of frames representing routines in the order executed.”).** Alpern further discloses the debug information having start and stop time of said plurality of execution methods for said block **(col: 6 line: 29-43 with emphasis on lines 41-43; Fig 6C, 6D and description).** An advantage of having detailed information such as the order of execution and the start / stop time of execution is that the programmer can better understand which parts of the program are unutilized / take up the longest amount of time. Therefore, the programmer could reduce that time and reducing the overall time by optimizing the sections of blocks (groups) / specific methods. Thereby

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saving computing time and costs associated therewith.

As per claim 2, Mathwork discloses: The method of claim 1, comprising the further steps of:

wrapping data generated by the execution of said model in an object, said wrapping encapsulating said execution-generated data in said object **(11-3: How to Specify a Path for a Simulink Object, 9-4 "To File", 9-61, -144, -145);** and exposing said data to said debugger via at least one interface to said object **(9-92 the exposure occurs when the debugger reads the information into the memory "From File", 9-61, -144, -145).**

As per claim 3, MathWorks discloses: The method of claim 2, comprising the further step of: altering said data via said interface **(-131, 4-2: "An important advantage is that...").**

As per claim 5, MathWorks discloses: The method of claim 1, comprising the further steps of:

processing said model to create compiled model information **(1-10 bullet 2, 1-12, 8-2: "C language S-functions are compiled as MEX-files using the mex utility described in the Application Program Interface Guide. As with other MEX-files, they are dynamically linked into MATLAB when needed.);** and programmatically generating executable code from said compiled model information, said code including an interface to said debugger **(1-12: linked, 8-36 first 3 para, 8-42: cg\_sfuns.h is included if the file is being used in conjunction with the Simulink Real-Time Workshop to produce a stand-alone or real-time executable.).**

As per claim 7, MathWorks discloses: The method of claim 6, comprising the further steps of:

saving an execution history for said executable code **(MathWorks' "Target Language Compiler Reference Guide" ("TLC") further expands on this inherent feature on page A-20 "This history is saved in the real-work vector.");** and outputting the execution history by at least one of saving it in a permanent memory location **(this feature is inherent),** displaying it for a user **(the GUI displays the results to the users, furthermore, the data stored to the files is viewable by users),** or sending it to a

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printing device to be printed **(RTW: 4-9, MathWorks: 3-26).**

As per claim 8, MathWorks discloses: The method of claim 6 wherein said debugger is started after compilation and before the execution of said code **(this feature is inherent within the disclosure. Specifically, the debugger must have something to debug and therefore debugs after the compilation has finished. Furthermore, the debugger starts the execution of the code and is therefore started before the execution of the code.)**.

As per claim 9, MathWorks discloses: The method of claim 1, comprising the further step of:

indicating graphically using said debugger a plurality of blocks that are part of an algebraic loop when the executing model is processing the algebraic loop **(7-10, 12-14, 12-18, 4-20 first para)**.

As per claim 17, MathWorks discloses: The method of claim 1, comprising the further step of:

communicating with an external mode simulation with said debugger **(8-114:**

**"SS\_SIMMODE\_EXTERNAL — External mode simulation")**.

As per claim 18, MathWorks discloses: The method of claim I, comprising the further step of:

saving a snapshot of data relating to model execution during execution of said model, said snapshot data sufficient to enable the subsequent restarting of the execution of said model using said snapshot data **(4-16: "You can also save the final states for a simulation and apply them to another simulation. This feature might be useful when you want to save a steady-state solution and restart the simulation at that known state.").**

As per claim 19, MathWorks discloses: The method of claim 18 wherein said snapshot data is saved programmatically at least one or more of a regular interval or based on a user-defined parameter **(4-16:**

**"You can also save the final states for a simulation and apply them to another simulation. This feature might be useful when you want to save a steady-state solution and restart the simulation at that known state." The user defined parameter is whenever the user chooses to do so manually.)**.

As per claim 20, MathWorks discloses: The method of claim 19, comprising the further step of: loading a



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saved snapshot into said debugger; and

executing a saved model based on said saved snapshot, said saved model executing from a point in time said snapshot was saved using information from said saved snapshot **(4-16: "You can also save the final states for a simulation and apply them to another simulation. This feature might be useful when you want to save a steady-state solution and restart the simulation at that known state.")**.

As per claim 21, MathWorks discloses: The method of claim 18, comprising the further step of: displaying graphically to a user the saved snapshot data **(this feature is inherent when the snapshot is restarted)**.

As per claim 22, MathWorks discloses: The method of claim 21, comprising the further step of displaying graphically to a user at least one additional set of snapshot data without restarting the execution of said model **(This feature is inherent, it is the filename of the snapshot.)**.

As per claim 24, MathWorks discloses: The method of claim 18, comprising the further step of: saving a difference between a set of current model execution data and a saved snapshot **(this feature is inherent. Specifically, when the simulation is restarted from a snapshot point and later saved it will be saved with the difference incorporated within the new snapshot.)**.

As per claim(s) 25-27, 29-33, 41-46, note the rejection of claim(s) 1-3, 5-9, 17-22, 24 above. The Instant Claim(s) is/are functionally equivalent to the above-rejected claim(s) and is/are therefore rejected under same prior-art teachings.

As per claim 48, note the rejection of claims 1-2 above. The Instant Claim recites substantially same limitations as the above-rejected claims and therefore rejected under same prior-art teachings, but for: identifying a first execution method operating in a first environment of a modeling application that executes a model, where the first environment is one of a text-based environment, a time-based block diagram, a state based block diagram, or a data-flow diagram **(B-2 model file ... text-based environment)**;

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identifying a second execution method operating in a second domain, where the second domain differs from the first domain **(1-6: GUI-based tools for designing simulating and analyzing systems).**

As per claims 49-50, note the rejection of claim 1-2 above. The Instant Claims recite substantially same limitations as the above-rejected claim and therefore rejected under same prior-art teachings.

MathWorks discloses: 51. The method of claim 48, further comprising:

displaying a hierarchy containing information about the first execution method or the second execution method, the hierarchy allowing a user to identify relationships between the first execution method and the second execution method, the first execution method and another execution method, or the second execution method and the another execution method **(1-3: "You can view the system at a high-level, then double-click on blocks to go down through the levels to see increasing levels of model detail.").**

MathWorks discloses: 53. The method of claim 48, further comprising: identifying the first execution method or the second execution method using a visual indicator to identify when the first execution method or the second execution method is executing **(12-5).**

As per claim 52, note the rejection of claims 1-2, 51, 53 above. The Instant Claim recites substantially same limitations as the above-rejected claims and therefore rejected under same prior-art teachings.

As per claim 54, note the rejection of claim 1 above. The Instant Claim recites substantially same limitations as the above-rejected claim and therefore rejected under same prior-art teachings.

MathWorks discloses: 55. (previously presented) A method, comprising:

identifying a first root method comprising one or more child methods, the first root method related to a graphical modeling application; identifying a second root method related to the graphical modeling application **(4-22: y, y1..yn);**

running the first root method and the second root method in a graphical debugger to obtain information about the operation of the first root method or the second root method, the graphical debugger concurrently interfaced with a method list of methods called during simulation of a model in the

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graphical modeling application and a model view of a model in the graphical modeling application **(1-2; 3-49)**; and displaying a debugging result to a destination, the debugging result comprising visual identifiers related to the operation of the first root method, the one or more child methods or the second root method, error information about the first root method, the one or more child methods or the second root method, an execution result for the first root method, the one or more child methods or the second root method, or status information related to the first root method, the one or more child methods or the second root method **(8-46, 8-111, 11-2; 3-51 (systems list); 4-25; 11-15; A-7; Alpern: Fig 5, 6A-D and descriptions)**.

As per claim 56, note the rejection of claim 55 above. The Instant Claim recites substantially same limitations as the above-rejected claim and therefore rejected under same prior-art teachings.

MathWorks discloses: 57. The method of claim 56, wherein the displaying an indicator further comprises:

displaying a first symbol when the status is related to the first root method; and displaying a second symbol when the status is related to the one or more child methods or the second root method **(3-19; 6-14; -118; 10-15; A-7)**.

MathWorks discloses: 58. The method of claim 56, wherein the displaying an indicator further comprises:

displaying a first color to represent a first status related to the first root method; and displaying a second color to represent a second status related to one of the one or more child methods or the second root method **(3-19; 6-14; -118; 10-15; A-7)**.

MathWorks discloses: 59. The method of claim 56, further comprising:

displaying the hierarchy in a first region related to one or more display devices; and displaying a graphical diagram related to the first root method or the second root method in a second region related to the one or more display devices, the graphical diagram synchronized with information displayed in the first region **(3-19; 6-14; -118; 10-15; A-7)**.

As per claim 60-66, note the rejection of claims 50-51, 57-60 above. The Instant Claim recites substantially same limitations as the above-rejected claims and therefore rejected under same prior-art teachings.

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MathWorks discloses: 66. The method of claim 65, wherein the first indicator or the second indicator are a color, a pointer, a symbol, a font, or a border **(A-7)**.

MathWorks discloses: 67. The method of claim 64, wherein the first display area comprises a window that displays information about the graphical icon or the graphical icon debugging information **(2-6; 2-7; 2-11; 3-49)**.

MathWorks discloses: 68. The method of claim 67, wherein the window comprises a visual indicator to connect the window to the graphical icon or to the graphical icon debugging information **(2-6; 2-7; 2-11; 3-49)**.

MathWorks discloses: 69. The method of claim 64, further comprising: displaying an execution list in the hierarchy, the execution list related to the root method or the one or more child methods **(3-49)**.

MathWorks discloses: 70. (new) The method of claim 1, wherein the model comprises a plurality of blocks having execution methods, and wherein the debug information indicates an order of execution of said execution methods of said plurality of blocks, during execution of the model.

MathWorks discloses: 71. (new) The medium of claim 25, wherein the model comprises a plurality of blocks having execution methods, and wherein the debug information indicates an order of execution of said execution methods of said plurality of blocks, during execution of the model

14. Claim 4, 10-16, 23, 28, 34-40, 47 rejected under 35 U.S.C. 103(a) as being unpatentable over

MathWorks's Simulink, 1997 ("MathWorks") as applied to claim 1 above, and further in view of

**Official Notice taken** (admitted prior art) further in view of Alpern **(US 7107578)** and further in view of Fenlason's "GNU gprof" ("GNU gprof") (1998).

As per claim 4, MathWorks discloses all limitations of claim 1, and that the execution-generated data is at least one of state information **(4-16 "Loading and Saving States", -131, A-22: signal generators, etc, 8-65)**, block inputs, block outputs **(3-15, 8-46 "In general, block inputs and outputs are written", 9-80)**, solver data **(4-4, 4-6, 4-16)**, signal values for said model **(-119, 8-124)**.

MathWorks however does not explicitly disclose profiling data. GNU gprof however discloses an

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analogous application profiling system having the said feature (**page 14, "The primary line of this entry describes the total time spent directly in the functions of the cycle."**). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the references in order to time the execution of a program and routines of the program in order to identify which portions of the program cause a bottleneck and resolve them.

As per claim 10, MathWorks discloses: The method of claim 1, comprising the further step of: saving a record of a unique execution method invocation, (**1-3: "After you define a model, you can simulate it, using a choice of integration methods, either from the Simulink menus or by entering commands in MATLAB's command window."**). MathWorks however does not substantially disclose said execution unique execution method invocation comprising information related to the execution of one of said plurality of execution methods that belongs to said block or to another block in the model, a system, or a model instance in an execution list of called execution methods. GNU gprof however discloses an analogous application profiling system having the said feature (**page 11: Call Graph**).

As per claim 11, MathWorks discloses all limitations of claim 10. MathWorks does not expressly disclose that the unique execution method invocation record comprises information about child records of a subset of said plurality of execution executed inside said unique execution method invocation record. GNU gprof however discloses the said features (**page 12 section titled "children"**). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the references in order to time the execution of a program and routines of the program in order to identify which portions of the program cause a bottleneck and resolve them.

As per claim 12, MathWorks discloses all limitations of claim 11. MathWorks however does not expressly disclose that a link is provided from said unique execution method invocation record to said child record. GNU gprof however discloses an analogous system having the said feature (**page 6 section titled "--file-ordering map\_file": "The '--file-ordering' option causes gprof to print a suggested .o link line ordering for the program based on profiling data."**). It would have been obvious to one of ordinary skill in the art at the time of

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Applicant's invention to combine the references in order to time the execution of a program and routines of the program in order to identify which portions of the program cause a bottleneck and resolve them. As per claim 13, MathWorks discloses all limitations of claim 10. MathWorks does not however expressly disclose that the said unique execution method invocation record comprises information regarding at least one parent record of one or more of the plurality of execution methods in which said unique execution method invocation is executed. GNU gprof however discloses an analogous system having the said feature **(page 11: Call Graph)**. It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the references in order to time the execution of a program and routines of the program in order to identify which portions of the program cause a bottleneck and resolve them.

As per claim 14, MathWorks discloses all limitations of claim 13. MathWorks however does not expressly disclose a link is provided from said unique execution method invocation record to said parent record. GNU gprof however discloses an analogous system having the said feature **(page 6 section titled "--file-ordering map\_file": "The '--file-ordering' option causes gprof to print a suggested .o link line ordering for the program, page 11: Call Graph)**. It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the references in order to time the execution of a program and routines of the program in order to identify which portions of the program cause a bottleneck and resolve them.

As per claim 15, MathWorks discloses all limitations of claim 10. MathWorks however does not expressly disclose that the said unique execution method invocation record comprises data about a state of the method invocation. GNU gprof however discloses an analogous system having the said feature **(page 11: Call Graph - called column)**.

As per claim 16, MathWorks discloses all limitations of claim 15. MathWorks however does not expressly disclose that the said state indicates the method invocation is at one of the states of entering, entered, exiting and exited **(page 11: Call Graph)**.

As per claim 23, MathWorks discloses all limitations of claim 22. MathWorks however does not expressly

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disclose that the said set of snapshot data is displayed in order of decreasing time. This is merely a design choice. Microsoft Windows allows for sort of descending or ascending names, file types, sizes, creation and modification dates. This is done for faster searching and identification of the user-required information.

As per claim(s) 28, 34-40, and 47, note the rejection of claim(s) 4, 10-16, and 23 above. The Instant Claim(s) is/are functionally equivalent to the above-rejected claim(s) and is/are therefore rejected under same prior-art teachings.

### ***Support for Amendments and Newly Added Claims***

Applicants are respectfully requested, in the event of an amendment to claims or submission of new claims, that such claims and their limitations be directly mapped to the specification, which provides support for the subject matter. This will assist in expediting compact prosecution. MPEP 714.02 recites: "Applicant should also specifically point out the support for any amendments made to the disclosure. See MPEP § 2163.06. An amendment which does not comply with the provisions of 37 CFR 1.121(b), (c), (d), and (h) may be held not fully responsive. See MPEP § 714." **Amendments not pointing to specific support in the disclosure may be deemed as not complying with provisions of 37 C.F.R.**

**1.131(b), (c), (d), and (h) and therefore held not fully responsive.** Generic statements such as "Applicants believe no new matter has been introduced" may be deemed insufficient.

### ***Requests for Interview***

15. In accordance with 37 CFR 1.133(a)(3), requests for interview must be made in advance.

Interview requests are to be made by telephone (571-272-8634) call or FAX (571-273-8634).

Applicants must provide a detailed agenda as to what will be discussed (generic statement such as "discuss §102 rejection" or "discuss rejections of claims 1-3" may be denied interview).

The detail agenda along with any proposed amendments is to be written on a PTOL-413A or a custom form and should be faxed (or emailed, subject to MPEP 713.01.I / MPEP 502.03) to the Examiner at least 3 days prior to the scheduled interview.

16. Interview requests submitted within amendments may be denied because the Examiner was not

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notified, in advance, of the Applicant Initiated Interview Request and due to time constraints may not be able to review the interview request to prior to the mailing of the next Office Action.

***Conclusion***

17. All claims are rejected.

18. The Instant Application is not currently in condition for allowance.

Applicant's amendment necessitated the new ground(s) **(35 USC 112 P1 rejections)** of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Silver whose telephone number is (571) 272-8634. The examiner can normally be reached on Monday thru Friday, 10am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at



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866-217-9197 (toll-free).

/ DS /

David Silver, Patent Examiner  
Art Unit 2128

/Hugh Jones/

Primary Examiner, Art Unit 2128